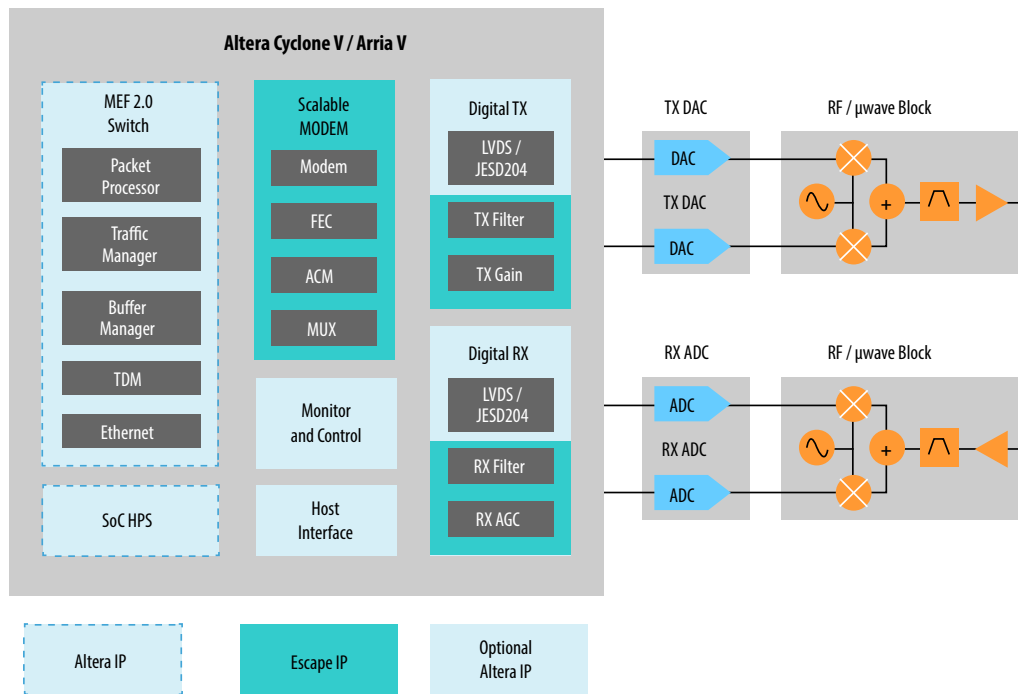


Altera and Escape Communications' Microwave Modem Solution

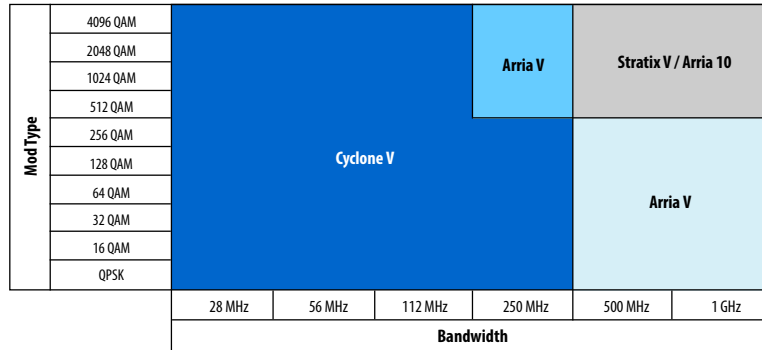
Altera and Escape Communications have partnered to provide a turnkey scalable solution suite for microwave and millimeter-wave backhaul and fronthaul applications based on Altera's Cyclone V and Arria V FPGAs with Escape's microwave modem IP. The modem IP features hitless Adaptive Coding and Modulation (ACM), Forward Error Correction (FEC), adaptive equalization, and a complete field-proven radio management software stack. When combined with Altera's standard IP blocks, SOC devices featuring dual ARM-9 cores, and MEF2.0 certified switch IP, the modem solution provides a complete single-chip mobile backhaul solution that can be scaled to meet a wide range of link capacities supporting megabits to multi-gigabit data rates. The microwave modem solution meets system requirements of traditional microwave backhaul applications and emerging millimeter-wave applications in E and V bands. For example, an E-band link operating in a 1 GHz bandwidth can provide capacities exceeding 5Gbps enabling operators to meet the rapidly evolving backhaul and fronthaul requirements of LTE and LTE-A networks.

System Block Diagram Including Modem Solution and Optional MEF2.0 Ethernet Switch



The modem operates from QPSK to 4096 QAM and from 3.5 MHz to 1 GHz RF bandwidth and is scalable with customers selecting the best FPGA for the application. Lower capacity systems could use the Cyclone V FPGA while higher capacities the Arria V FPGA. Ultra high-capacities could use the Stratix V or upcoming Arria 10 devices.

Typical FPGA Device Family Used as a Function of Modulation Type and Bandwidth



Altera offers MEF 2.0 certified switch based on Altera's Triple-Speed Ethernet MegaCore function providing > 5Gbps capacity. Altera Ethernet switch IP when incorporated with the Escape modem IP solution provides a single chip mobile backhaul solution.

| Key Modem Features | Key FPGA / Altera IP Features |
|---|---|
| <ul style="list-style-type: none"> • QPSK to 4096 QAM • 3.5 MHz to 1 GHz BW • Hitless Adaptive Coding and Modulation (ACM) • Standard and Enhanced Forward Error Correction (FEC) • Cross-polarization cancellation (XPIC) • Adaptive equalization • SYNC-E and IEEE 1588V2 support • Configurable phase noise and phase hit mitigation • Frequency tracking • IQ imbalance compensation • Complete field-proven radio management software stack <ul style="list-style-type: none"> – HTML GUI – SNMP client – Extensive diagnostics application – Applications, libraries, and drivers | <ul style="list-style-type: none"> • Scalable from Cyclone V to Arria V and Stratix V • ARM Hard Processor System (HPS) • JESD204B and LVDS data converter support • Carrier grade Ethernet Switch MEF 2.0 available including <ul style="list-style-type: none"> – > 5Gbps Capacity – Full L2 control protocol handling as specified by MEF – 1588V2 support – Sync E support – TDM interface – XAUI Interface |

Want to Know More?

Visit our website or call your local Altera sales representative today to learn more about how Altera FPGAs can help you enable your microwave backhaul.

www.altera.com/end-markets/microwave-backhaul

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